

APPENDIX B-1
APPENDIX B TO PART 195 – RISK-BASED ALTERNATIVE TO PRESSURE TESTING
OLDER HAZARDOUS LIQUID AND CARBON DIOXIDE PIPELINES
RISK-BASED ALTERNATIVE

This Appendix provides guidance on how a risk-based alternative to pressure testing older hazardous liquid and carbon dioxide pipelines rule allowed by Sec. 195.303 will work. This risk-based alternative establishes test priorities for older pipelines, not previously pressure tested, based on the inherent risk of a given pipeline segment. The first step is to determine the classification based on the type of pipe or on the pipeline segment's proximity to populated or environmentally sensitive area. Secondly, the classifications must be adjusted based on the pipeline failure history, product transported, and the release volume potential.

Tables 2-6 give definitions of risk classification A, B, and C facilities. For the purposes of this rule, pipeline segments containing high risk electric resistance-welded pipe (ERW pipe) and lapwelded pipe manufactured prior to 1970 and considered a risk classification C or B facility shall be treated as the top priority for testing because of the higher risk associated with the susceptibility of this pipe to longitudinal seam failures.

In all cases, operators shall annually, at intervals not to exceed 15 months, review their facilities to reassess the classification and shall take appropriate action within two years or operate the pipeline system at a lower pressure. Pipeline failures, changes in the characteristics of the pipeline route, or changes in service should all trigger a reassessment of the originally classification.

Table 1 explains different levels of test requirements depending on the inherent risk of a given pipeline segment. The overall risk classification is determined based on the type of pipe involved, the facility's location, the product transported, the relative volume of flow and pipeline failure history as determined from Tables 2-6.

Table 1. Test Requirements-Mainline Segments Outside of Terminals, Stations, and Tank Farms

Pipeline segment	Risk classification	Test deadline ¹	Test medium
Pre-1970 Pipeline Segments susceptible to longitudinal seam failures ² .	C or B	12/7/2000 ³	Water only.
All Other Pipeline Segments	A	12/7/2002 ³	Water only.
	C	12/7/2002 ⁴	Water only.
	B	12/7/2004 ⁴	Water/Liq. ⁵
	A	Additional pressure testing not required	

¹ If operational experience indicates a history of past failures for a particular pipeline segment, failure causes (time-dependent defects due to corrosion, construction, manufacture, or transmission problems, etc.) shall be reviewed in determining risk classification (See Table 6) and the timing of the pressure test should be accelerated.

² All pre-1970 ERW pipeline segments may not require testing. In determining which ERW pipeline segments should be included in this category, an operator must consider the seam-related leak history of the pipe and pipe manufacturing information as available, which may include the pipe steel's mechanical

properties, including fracture toughness; the manufacturing process and controls related to seam properties, including whether the ERW process was high-frequency or low-frequency, whether the weld seam was heat treated, whether the seam was inspected, the test pressure and duration during mill hydrotest; the quality control of the steel-making process; and other factors pertinent to seam properties and quality.

³ For those pipeline operators with extensive mileage of pre-1970 ERW pipe, any waiver requests for timing relief should be supported by an assessment of hazards in accordance with location, product, volume, and probability of failure considerations consistent with Tables 3, 4, 5, and 6.

⁴ A magnetic flux leakage or ultrasonic internal inspection survey may be utilized as an alternative to pressure testing where leak history and operating experience do not indicate leaks caused by longitudinal cracks or seam failures.

⁵ Pressure tests utilizing a hydrocarbon liquid may be conducted, but only with a liquid which does not vaporize rapidly.

Using LOCATION, PRODUCT, VOLUME, and FAILURE HISTORY "Indicators" from Tables 3, 4, 5, and 6 respectively, the overall risk classification of a given pipeline or pipeline segment can be established from Table 2. The LOCATION Indicator is the primary factor which determines overall risk, with the PRODUCT, VOLUME, and PROBABILITY OF FAILURE Indicators used to adjust to a higher or lower overall risk classification per the following table.

Table 2.-Risk Classification

Risk Classification	Hazard location indicator	Product/volume indicator	Probability of failure indicator
A	L or M	L/L	L.
B		Not A or C Risk Classification	
C	H	Any	Any.

H=High M=Moderate L=Low.

Note: For Location, Product, Volume, and Probability of Failure Indicators, see Tables 3, 4, 5, and 6.

Table 3 is used to establish the LOCATION Indicator used in Table 2. Based on the population and environment characteristics associated with a pipeline facility's location, a LOCATION Indicator of H, M or L is selected.

Table 3.-Location Indicators-Pipeline Segments

Indicator	Population ¹	Environment ²
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H	Non-rural areas	Environmentally sensitive ² areas.
M	
L	Rural areas	Not environmentally sensitive ² areas.

¹ The effects of potential vapor migration should be considered for pipeline segments transporting highly volatile or toxic products.

² We expect operators to use their best judgment in applying this factor.

Tables 4, 5 and 6 are used to establish the PRODUCT, VOLUME, and PROBABILITY OF FAILURE Indicators respectively, in Table 2. The PRODUCT Indicator is selected from Table 4 as H, M, or L based on the acute and chronic hazards associated with the product transported. The VOLUME Indicator is selected from Table 5 as H, M, or L based on the nominal diameter of the pipeline. The Probability of Failure Indicator is selected from Table 6.

Table 4.-Product Indicators

Indicator	Considerations	Product examples
H	(Highly volatile and flammable).....	(Propane, butane, Natural Gas Liquid (NGL), ammonia)
	Highly toxic	(Benzene, high Hydrogen Sulfide content crude oils).
M	Flammable – flashpoint < 100F	(Gasoline, JP4, low flashpoint crude oils)
L	Non-flammable – flashpoint 100+F..	(Diesel, fuel oil, kerosene, JP5, most crude oils).
	Highly volatile and non-flammable/non-toxic	Carbon Dioxide.

Considerations: The degree of acute and chronic toxicity to humans, wildlife, and aquatic life; reactivity; and, volatility, flammability, and water solubility determine the Product Indicator. Comprehensive Environmental Response, Compensation and Liability Act Reportable Quantity values can be used as an indication of chronic toxicity. National Fire Protection Association health factors can be used for rating acute hazards.

Table 5.-Volume Indicators

Indicator	Line size
H	>= 18".
M	10" – 16" nominal diameters.
L	<= 8" nominal diameter.

H=High M=Moderate L=Low.

Table 6 is used to establish the PROBABILITY OF FAILURE Indicator used in Table 2. The "Probability of Failure" Indicator is selected from Table 6 as H or L.

Table 6.-Probability of Failure Indicators [in each haz. location]

Indicator	Failure history (time-dependent defects) ²
H ¹	> Three spills in last 10 years.
L	<= Three spills in last 10 years.

H=High L=Low.

¹ Pipeline segments with greater than three product spills in the last 10 years should be reviewed for failure causes as described in subnote ². The pipeline operator should make an appropriate investigation and reach a decision based on sound engineering judgment, and be able to demonstrate the basis of the decision.

² Time-Dependent Defects are defects that result in spills due to corrosion, gouges, or problems developed during manufacture, construction or operation, etc.

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